THE METAL INDUSTRY

With which is Incorporated The Aluminum World.
The Brass Founder and Finisher and Electro Platers Review.

A TRADE JOURNAL RELATING TO THE NON-FERROUS METALS AND ALLOYS.

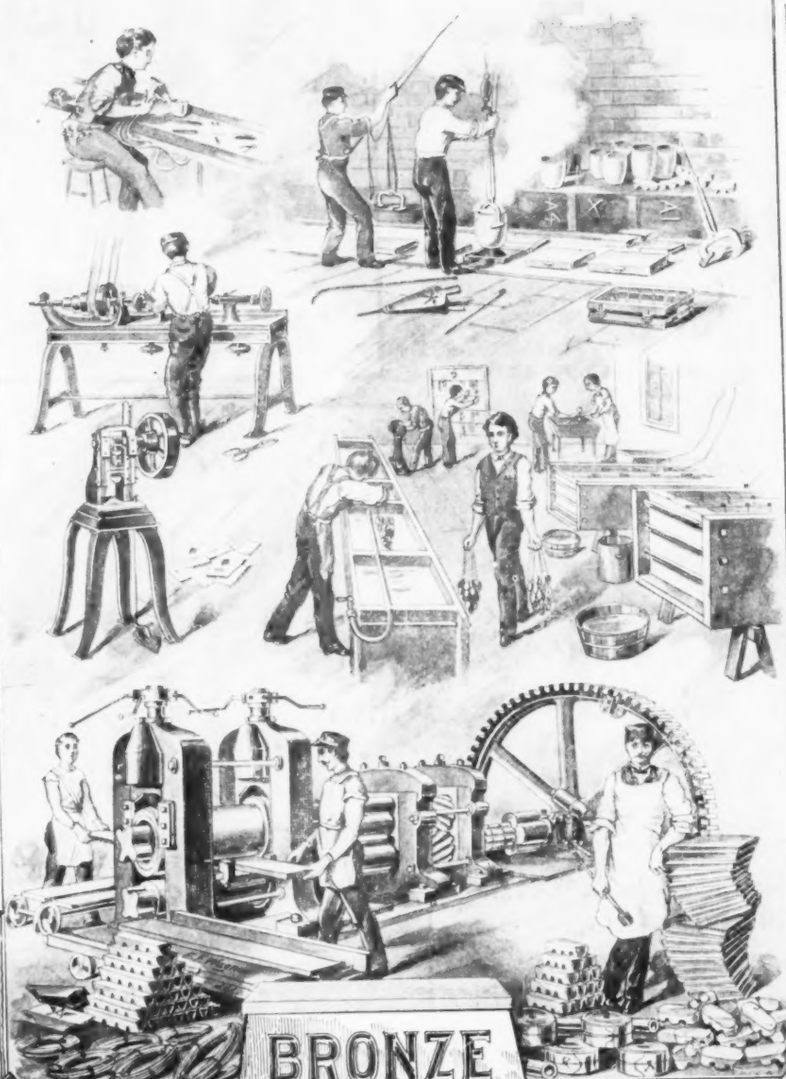
ALUMINUM · COPPER · METALLOGRAPHY · BRASS · METALLURGY

NICKEL · SILVER · GOLD

MELTING · CASTING · REFINING · SOLDERING · BRAZING · PLATING

SOLDERING · BRAZING · STAMPING · SPINNING · TUBE-MAKING · POLISHING

TIN · LEAD · ZINC



BRONZE

OLD SERIES
Vol. X. No. 2.
Vol. II No. 2.
NEW SERIES

LABOR OMNIA VINCIT

FEBRUARY, 1904

NEW YORK.

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Entered February 10, 1903, at New York, N. Y., as second-class matter under act of Congress. March 3, 1879.

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AND
THE ALUMINUM WORLD
AND
THE BRASS FOUNDER AND FINISHER
AND
ELECTRO PLATERS REVIEW

PUBLISHED MONTHLY BY

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ADVERTISING RATES ON APPLICATION.

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CONTENTS

DISPLACING CONDENSER TUBING.

The consumption of seamless brass tubing in the manufacture and maintenance of condensers is far greater than in any other single use, and its replacement by a ferrous metal would seriously cripple our brass industry. The influence would be much the same were steel rails to be replaced or dispensed with and the steel manufacturer be obliged to exist without this business. In either case a vital point would be struck.

We cannot say what the actual consumption of brass condenser tubing is, as it depends, to a greater or less extent upon the activity displayed by the various navies and merchant marines of the world, but we may safely say that a single modern battleship contains some 40,000 pounds of this commodity. This single instance will serve to convey the magnitude of the condenser tube business and indicate how heavy a blow would be struck the brass industry were brass condenser tubes to become a thing of the past.

The steel people have recently made attempts to undermine the brass condenser tubing and to substitute nickel steel. Although the matter is yet in the experimental stage, the results obtained have been quite promising, and sufficiently so to warrant further attention being paid to it. A steel containing 30 per cent. of nickel is used. Our own experiments, conducted with a steel containing 27 per cent. of nickel, showed that sea water corrodes it, but quite slowly. We are free to confess, however, that the condenser tube question is not one of actual corrosion, but of disintegration, and that a tube may corrode and yet be satisfactory. It must corrode evenly, however; otherwise pits and finally holes form.

Brass condenser tubing certainly gives good results in some instances, and very bad in others. Various explanations have been offered for this anomaly, but we cannot agree with them in every case. One investigator has offered the solution of the problem by asserting that it is the "nature of the beast." The fact yet remains, however, that brass condenser tubing in certain places has lasted for years, and we believe that the time will come when the exact reason for its rapid deterioration in certain cases will be found.

The nickel steel tubes which were used for the experiments in the United States and abroad cost 45 cents per pound, and the scrap value is said to be about 6 cents per pound. Brass condenser tubing costs 23 cents per pound, and its scrap value is 5 cents per pound, so that the first

cost is very much in favor of brass. If nickel steel is enough better to warrant the great increase in cost, then its value will be certain. At this high cost of nickel steel, we believe that brass (or some other copper alloy), in spite of its bad qualities, will hold its own. The steel industry, however, is certainly endeavoring to wrest the condenser tube trade away from the brass mills, and the progress, will be watched with more than ordinary interest.

CRUCIBLE SIZES.

There appears to be considerable dissatisfaction among the large consumers of crucibles at the present time on account of the discovery of much disparity in the contents of a crucible when made by different makers. That this disparity actually exists is manifested in a recent test of crucibles from various makers, and which resulted in demonstrating that one crucible (a No. 60) actually held nearly forty pounds more of metal than the smallest.

We believe that this question is equally as interesting to the crucible maker as it is to the consumer. It indicates that there is surely something wrong in the present method of numbering crucibles or that such designations are useless. There seems to be a sort of universal understanding that a crucible shall hold three pounds of melted copper per number ("struck-measure"). Whether this is maintained in all instances remains for the consumer to discover, but we know that the best makers certainly adhere to it. If they do not, then the method of numbering crucibles is very misleading or actually meaningless.

In justice to the crucible makers, we will say that the consumer has forced upon him conditions which he has unwittingly accepted regardless of the fact that he was establishing a precedent that sooner or later must become a boomerang. Divers customers have appeared to him, from time to time, with the appeal that the regular size of crucible which they were using was not the correct shape, but that one higher than the present type was necessary in order to achieve certain results in the furnace. The crucible shape was accordingly changed, with the result that one which was formerly a No. 70 may have become a number larger, and yet the old number was placed upon the bottom of the crucible. Conditions may now have changed so that another crucible maker desires to obtain the business, and his first shipment of crucibles is condemned because they are deficient in holding capacity. Another instance actually arose in which a wrong shipment was made to a company which had been having a "large No. 70" and those of regular size sent. So long a time had elapsed since any regular size crucibles had been purchased that there had been a change in administration in the consumer's mill, and the crucibles were condemned because they were deficient in holding capacity, simply because they were considerably lacking in cubical contents when compared with previous shipments; and yet the crucibles were of standard size.

We would suggest as the remedy that the crucible maker either put an individual marking upon his crucibles, so as not to conform to other makes, or conform to the conditions which sooner or later will have to be met—that of adhering strictly to the true numbering of a crucible. Here is an opportunity for the crucible makers to adopt standard sizes so that a number on a crucible will signify that the crucible should hold a certain number of pounds of metal. The crucible user is beginning to test the holding capacity of the crucibles which are submitted to him for trial by varnishing the inside and weighing the water which they will hold. Multiplying the "struck" weight of water which a crucible will hold by 8.8 will give the weight of copper which will fill the crucible under the same conditions. A crucible to hold three pounds of copper per number should contain .34 pound of water. That there is need for uniformity is quite apparent, and we believe that it is to the interest of all concerned to adopt standard sizes.

CYANIDE POISONING.

The recent death of two workmen from cyanide poisoning in an electro-plating establishment in Providence, R. I., has brought to our mind the meagre knowledge that exists in factories of this description of the dangerous properties of potassium cyanide. We will confess that, as extensively as cyanide is used in the electro-plating industry, the number of instances of poisoning is surprisingly limited, but this fact may be due to good luck rather than to any exceptional care being exercised on the part of the employees.

As a solid substance, potassium cyanide stands paramount to every other known poison; as a liquid or gas, that made by treating the cyanide with an acid is the most violent poison known to science, and it was this latter which caused the death of the Providence workmen. They had mixed a cyanide solution with nitric acid, and had, therefore, generated the deadly hydrocyanic or prussic acid gas.

We believe that every plater who has learned his trade is aware of the poisonous properties of potassium cyanide, although, perhaps, not in as marked degree as he should; but we have come in contact with many of the unskilled employees of electro-plating establishments who, although cognizant of the fact that cyanide is poisonous, believe it within the same category as the double sulphate of nickel, blue vitriol, or sulphate of zinc. Indeed, it was our experience at one time to meet such an employee who was not even aware that potassium cyanide is poisonous at all as "he had never been told it was."

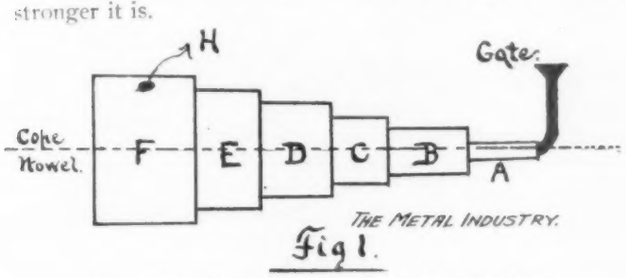
The recent use of potassium cyanide for the killing of a refractory elephant in Central Park, New York, and the fact that it was selected for this purpose on account of its extremely quick action will readily demonstrate the nature of this substance. In this instance a piece about the size of a walnut was used, which produced almost instant death. The action of this poison appears to be directly upon the heart.

In view of the ignorance of its properties and the careless manner in which potassium cyanide is handled in electro-plating establishments, we would suggest that notices be posted conspicuously in the various plating rooms setting forth the poisonous nature of cyanide, the danger involved in its use, that incurred when it is mixed with acid and, in cases of poisoning, the antidotes for it. Such notices would be quite inexpensive and would serve to forewarn the employees far better than any verbal admonition would ever do.

THE THEORY AND USE OF RISERS.

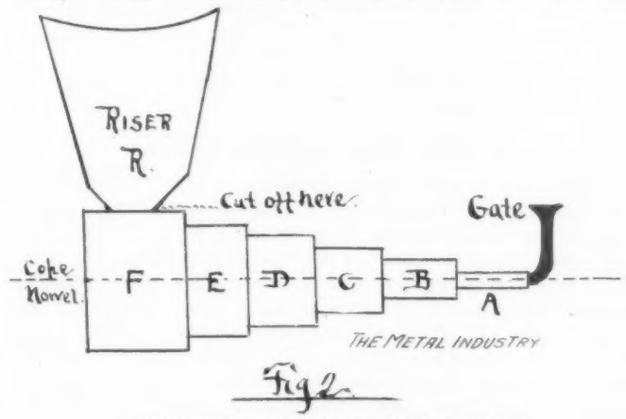
By Erwin S. Sperry.

It was not until the advent of strong metals that much attention was paid to the use of risers or sink-heads on castings, but early failures in casting steel in sand demonstrated that much care must be bestowed upon the use and situation of risers; if not, failure is sure to result. The early attempts to cast the strong bronzes in sand resulted in failure simply because little experience had been had up to that time with the proper employment of risers. The present unsatisfactory experience which the majority of foundrymen have with alloys like manganese or aluminum bronze appears to be caused by their entire ignorance of the proper function of risers or the fact that they are necessary at all. Strong metals all shrink enormously. Show me a metal which does shrink much and it will be a weak one. The more a metal or alloy shrinks the stronger it is.



SHOWING HOW SHRINK-HOLES ARE FORMED.

To begin, let us assume that a casting of the shape shown in Fig. 1 is to be cast. Of course it is supposed a metal with great shrinkage is to be used and we may take as an example manganese bronze, though these remarks and instructions apply equally to all metals which need risers. In the casting of the shape of Fig. 1 the small part, A, is the first to cool. When it begins to solidify it draws the metal from B and the latter, going through the same cooling process, draws from C. The part C draws from D and the latter from E. Now F is the largest portion of the casting, and is, therefore, the last to cool, so that E will draw its metal from it. Now the

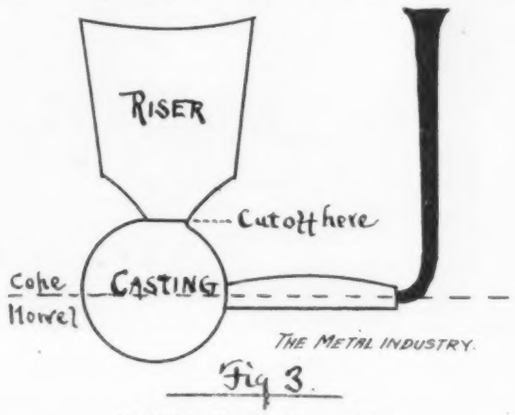


SHOWING PLACE TO ATTACH A RISER.

question arises about the disposition of the metal in F, as it has nothing to draw from, and herein lies a critical point. All the time that A, B, C, D and E are cooling F is also *beginning* to cool on the surface where it comes in contact with the wet sand, but the interior will remain liquid long after the other parts of the casting have become solid. As the skin of F, however, has become solid, there is nothing left to draw from except the center, and in such a shaped casting a shrink-hole will usually be found at H or a depression on the top or both.

The remedy for this state of affairs is to put a riser on F, as shown in Fig. 2. This riser, R, must be sufficiently large to cool last, so that F will draw from it and any cavities will be found in R, where they will do no harm. After the whole has cooled the riser R has to be cut off; an expensive and tedious job, but imperative nevertheless, as there appears to be no other method of removing it. The hack saw is the usual tool for cutting off risers.

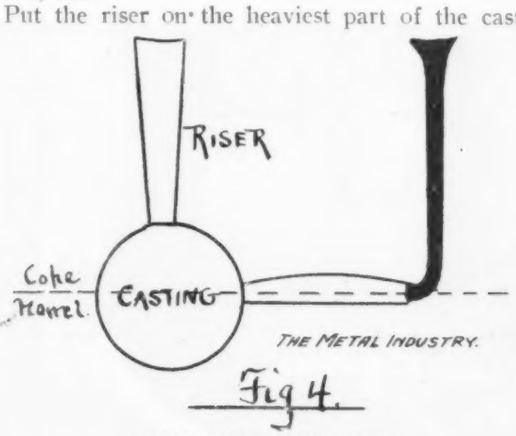
The great difficulty with beginners in the art of using risers is that they do not make them large enough. A small riser is worse than none at all for, instead of acting as a feeder, it actually draws from the casting and produces cavities which perhaps would not otherwise exist. It is a



PROPER SHAPE OF A RISER.

rule that the riser, unless fed by hot metal, must be larger than the part it is to feed. In Fig. 3 is shown a sketch of a casting with the proper shape of riser. It is sufficiently large and bulky to act as a feeder for the casting. In Fig. 4 is shown a method of putting on a riser which is wrong. The riser in this case is not large enough, and instead of feeding the casting, as it should, it draws from it. The following points in the use of risers should be observed, viz.:

1. Put the riser on the heaviest part of the casting.



WRONG SHAPE OF A RISER.

This is the part which needs feeding.

2. Make it of sufficient bulk to feed the casting properly. Height of riser, unless attended with sufficient bulk, has no influence. There must be the mass of metal in it to cool last of all.

3. If there are several large masses of metal in the casting connected by thin parts, then each should have a suitable riser.

4. It is better to make patterns for risers which the

molder can ram up with the pattern as there is then no liability of his cutting the improper size.

5. Do not make a riser with a long, thin neck where it enters the casting, as this portion may chill and prevent the casting from feeding. Slope the neck down as abruptly as possible, as shown in Figs. 2 and 3.

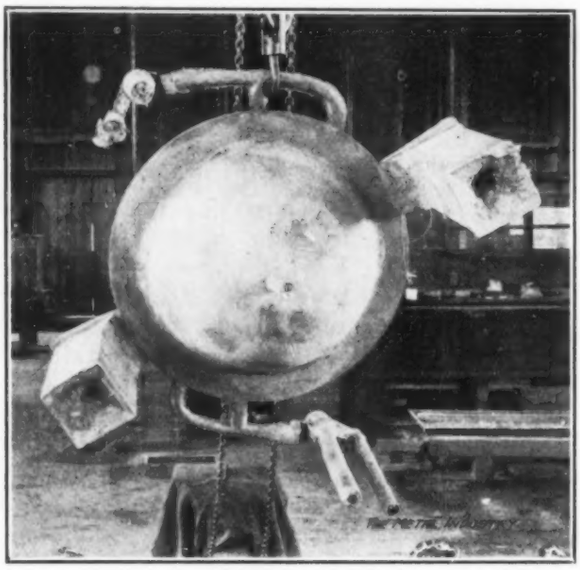


FIG. 5—A METHOD OF ATTACHING RISERS.

The height of a riser is of no importance in feeding a casting, as the bulk or mass of metal is what is necessary, but height is an excellent feature for the purpose of promoting soundness in the casting. The greater the height of the metal the sounder the casting and more free from blowholes, as it puts a pressure on the metal. It is a well-known fact that pressure on liquid metal produces soundness and use is made of such a fact in the steel industry. In making ingots for armor plate and large guns an enormous hydraulic pressure is put on the metal while in the liquid state and allowed to cool while under this pressure.

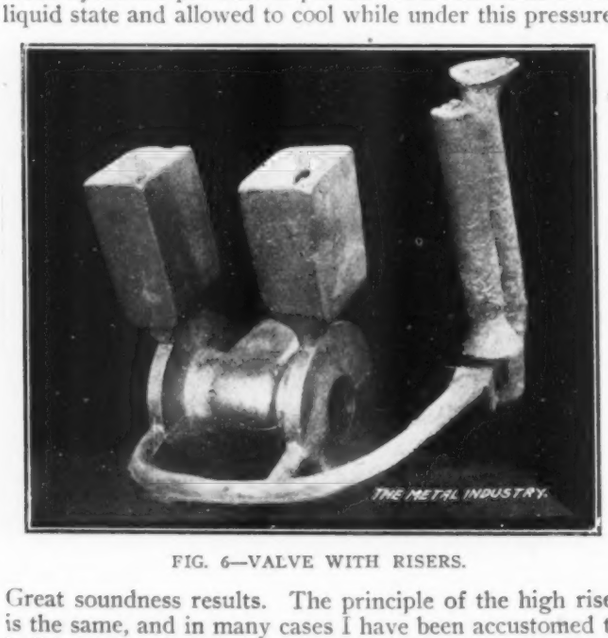


FIG. 6—VALVE WITH RISERS.

Great soundness results. The principle of the high riser is the same, and in many cases I have been accustomed to build up the riser above the top of the cope in order to have as much pressure on the metal as possible.

If a riser is properly put on, the top will be found to have "piped" deeply. This is a good indication and shows that the casting as drawn from the riser. In Fig. 5 is shown a large casting with two risers, each placed as near as possible to two heavy lugs on the inside. It will be seen that these risers did the work and the casting was left sound. A large number of these castings were made in this manner and none were lost. This casting weighed 150 pounds, while each riser weighed nearly 100 pounds.

In Fig. 6 is shown a gate-valve casting with the proper method of applying risers. Each flange has its individual riser.

Artificial feeding of risers is often resorted to by pouring hot metal on the top of it and stirring with a rod. By this means smaller risers may be used than otherwise, as the riser does not chill, but my experience has been that this is far less conducive to good results than to have a heavy riser and let it alone. By the proper disposition of risers in places where necessary almost any shape casting may be made. Risers to a large extent also prevent cracks in the casting.

A form called a "blind" riser is occasionally used. It differs from the regular form in that it does not appear through the cope, and cannot be seen when this has been put on. If of sufficient bulk, however, it is equally as efficacious as the regular form of riser.

MARKET FOR OLD CRUCIBLES.

The continued high price of plumbago appears to have stimulated the search for sources of supply of a cheaper nature and old brass crucibles, which heretofore have been thrown on the dump, now possess a market value. Just what the crucibles are used for is not wholly known, but we believe that it is in the manufacture of foundry facings, stove clay, and possibly stove polish. We cannot find that any crucible manufacturer buys them, but they are sold to other parties. The market price at the present time is $3.00 per ton. Old steel crucibles have had a market value for a long time as a mixture in the manufacture of new brass crucibles, but heretofore the brass crucible has had no value.

It is scarcely worth while to grind up old crucibles with the foundry ashes, in order to obtain the metal, as, contrary to the usual belief, the metal does not go beyond the surface. But by carefully hand treating them so that all pieces of adhering metal are removed, it is believed that the best policy will be to sell them rather than to attempt to grind them up for the metal which they are supposed to contain.

MAKING PURE COPPER CASTINGS.

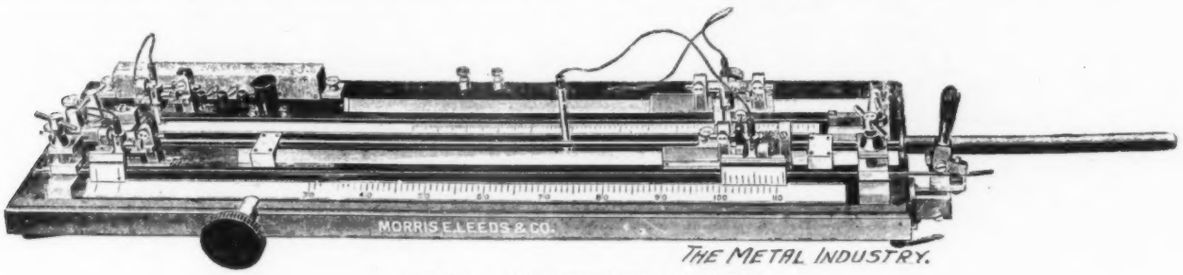
Absolutely sound copper castings may be obtained by the use of cyanide of potash as a flux in melting. As a flux, it stands paramount to everything else. It will produce results not obtainable with anything else. To produce such sound copper castings, melt the copper as usual under charcoal and add from two to three pounds of the cyanide and stir it in, allowing the whole to remain for some time, say five minutes. If overheating is avoided the copper may be cast in sand without the least sign of sponginess or blowholes. The castings are very soft and of very high conductivity, as the cyanide adds nothing to the metal. Cyanide of potash is certainly the best flux known.

Little is to be gained in using the highest price antimony in the manufacture of babbitt or anti-friction metals. Equally as good results are obtained by the use of the cheaper brands, and there is much gained in price. In the manufacture of britannia ware or pewter the case is different, and only the best grade should be used. The arsenic present in the cheap grades is deleterious in its influence on such goods.

THE HOOPES CONDUCTIVITY BRIDGE.

The most rapid and certain method for finding the purity of metals is a determination of their electrical conductivity. It matters not what the impurity is, nor how many foreign elements exists in the metal, the method is always the same. It is the most certain method known for finding out whether a metal is chemically pure or not, and, in fact, is practically the only method known for many metals. That this is so was demonstrated many years ago with the appearance of copper wire of high conductivity, as it was then the only method known for the quick determination of the purity of the metal. The method is yet in use, as there is nothing known even now which can equal it.

The principle of the method is correct and leaves little to be desired in the way of excellence of results, but heretofore there has been much dissatisfaction expressed in the form of apparatus which has been employed. The operation has taken too long. Bearing this in mind, Mr. William Hoopes has studied the question and devised and patented a form of apparatus which gives exceptionally quicky and accurate results. The apparatus was originally designed for the Pittsburg Reduction Company for testing aluminum wire, but is now in use by several copper wire producers.



HOOPES CONDUCTIVITY APPARATUS.

This apparatus has the feature of being direct reading and all that is necessary to do is to cut a wire of standard length, place it in the apparatus, strain it with the device for this purpose and read off the conductivity on the scale. No difficult calculation, dark room, or other troublesome features are necessary. The apparatus may be used with a large range of sizes and 100 or more determinations may be made upon it in a single day.

The apparatus is manufactured by The Leeds and Northrup Company, 259 North Broad street, Philadelphia, Pa., and is applicable to the determination of the electrical conductivity of any metal which can be drawn into wire. For copper wire manufacturers the apparatus is a necessity. For the manufacturers of bronze wire for electrical work and that of German silver wire for resistance coils it will be found a valuable adjunct. A reproduction of the apparatus is herewith shown.

DECAY OF A BRONZE STATUE.

The bronze statue surmounting the dome of the state capitol at Hartford, Conn., has become so corroded and deteriorated that it was deemed necessary to have it taken down and repaired. This statue represented Genius, and has been in position over a score of years, and upon investigation was found to be very badly corroded and also cracked in several places. The casting was made in several parts and joined together. The bust is cracked, and there is also a rent in the back. Blow holes appear in all the castings, and a committee has been appointed to determine whether they are more numerous than they should be.

CONSTANTIN, A NICKEL ALLOY.

Considerable quantities of nickel alloys are used in the form of wire for resistance work in electrical instruments. German silver wire containing 25 per cent of nickel is generally used, but is not found to be very satisfactory on account of the zinc which it contains. Zinc appears to give electrical qualities that are undesirable.

A wire called "*Constantin*" and made by the large brass rolling mill of Messrs. Basse and Selve, Altena, Germany, has achieved results in the electrical resistance line not yet obtained on other alloys. The following results obtained on a sample of the wire show that the Germans are able to roll alloys containing more nickel than we, but is also interesting in that it indicates that they use manganese in obtaining sound castings and for rendering the alloy ductile.

The wire obtained was .039 in. diam. and had the following characteristics:

Diam., .039 in.
Tensile strength per sq. in., 68,700 lbs. (annealed).
Elong., in 8-in., 30.5 per cent.
Reduction in area, 73.7 per cent.
Twists in 6 in., 206.

Analysis.
Copper, 57.04 per cent.
Nickel, 42.12 per cent.
Manganese, .46 per cent.
Iron, .38 per cent.
Zinc, none.

This wire is quite soft, as the number of twists indicate, and demonstrates that alloys high in nickel are, contrary to usual belief, soft rather than hard.

HEATING ZINC SHEET FOR PRESS WORK.

Zinc is a peculiar metal. When cold it is hard and crystalline, but if slightly heated it is very soft, and is susceptible to any treatment that brass may receive. In drawing zinc sheet in a press the small difference between the melting point of the metal and that of the temperature at which the best drawing takes place is so small that the problem of heating becomes serious if one is not conversant with the fact that zinc may be heated in oil. Attempts are made to heat by other means but much waste occurs.

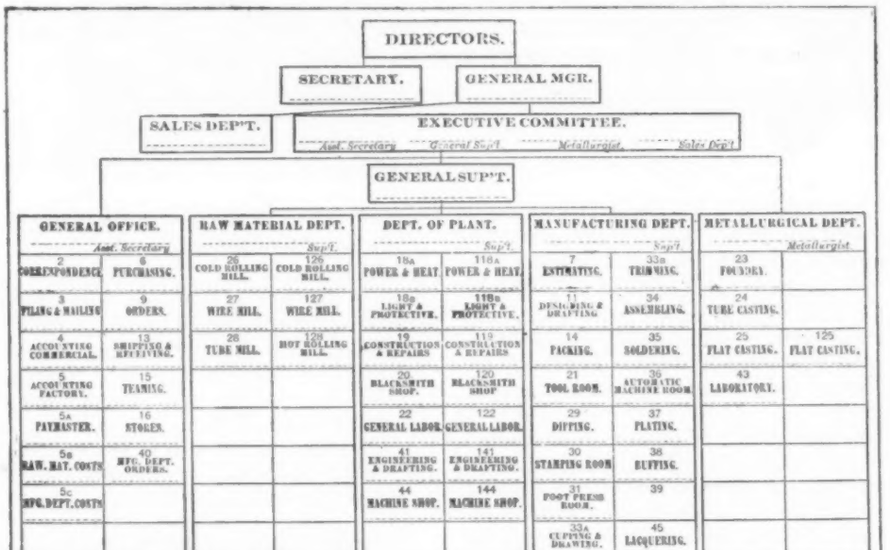
To heat in this manner a heavy oil with a high flash point should be used and a thermometer employed to register the temperature. This instrument will obviate any over or under heating and prevent waste from such means. In addition to acting as a heating agent the oil has a good effect on the drawing dies.

A method of producing soft zinc has been patented in France by the firm of L. Gührs et Cie, Veuve. Equal parts of zinc and aluminum are melted to which a small amount of bismuth is added. This alloy is added to molten zinc until volatilization ceases. The zinc is heated to a temperature of from 900 to 1,200 degrees F. It is stated that the zinc so produced is of 99 per cent. purity, and in addition to being soft it possesses other advantageous physical qualities.

BRASS MILL ORGANIZATION.

In former times little attention was paid to the organization of factory employees, and many mills allowed them to take care of themselves. Sharp competition at the present time has forced the abandonment of these antiquated methods and necessitated the establishment of a mill organization along military lines. The nearest such an organization approaches that of military discipline the more effective it is. It need not, of course, be subject to the stringent measures that army discipline receives, for employees require careful handling, but the simple fact that an employee knows who his superior is and to whom he is subject, suffices to bring about the required result. The idea is to give a man a certain thing to do and hold him alone responsible for it.

The Bridgeport Brass Company, of Bridgeport, Conn., have recently adopted such a shop organization with the intention of placing the responsibility where it belongs, and letting each employee know who his superior is and to whom he is subject. The following diagram was devised and is posted conspicuously in every department around the mill. Each department is known by a number, and over this is a foreman, who is responsible to the superintendent of that department, who is subject himself to the general superintendent. The numbering of each department renders the cost and other bookkeeping much easier and more accurate than if given a name and avoids any conflict.



This company has two separate plants in different parts of the city, which accounts for the two different department numbers in the same class of work. For instance, departments No. 27 and No. 127 are those in which wire is drawn, but No. 27 is in one plant, while No. 127 is in the other. Were it not for the numbering of the different departments the charging and crediting of material to these two subdivisions would be liable to much confusion.

Henry A. Matthews, formerly of the Matthews & Willard Company, of Waterbury, Conn., and later the founder of the firm of H. A. Matthews & Co., of Seymour, Conn., died in Waterbury on Dec. 31, aged 78 years. Mr. Matthews was identified with the manufacture of brass goods for many years. He was quite prominent in public life and for two years was Mayor of Waterbury.

MORE AMERICAN BRASS COMPANY CHANGES.

More changes have taken place in The American Brass Company, of Waterbury, Conn. Adelbert P. Hine, superintendent of The Coe Brass Company plant, has been made general superintendent of all the plants. George Braham, who has been assistant superintendent of The Coe Brass Company, has been made superintendent and William E. Besse has been promoted to the position of assistant superintendent.

The purchasing for all the American Brass Company's plants, viz.: The Coe Brass Company, The Benedict & Burnham Company, The Waterbury Brass Company, The Ansonia Brass and Copper Company, The Holmes, Booth & Haydens Company and The Chicago Brass Company is now done by the American Brass Company at its Waterbury office and not by the individual plants, as heretofore. F. L. Adams, formerly general manager of The Holmes, Booth & Haydens Company, has been made assistant purchasing agent of The American Brass Company.

THE AJAX METAL COMPANY EXPANDS.

The Ajax Metal Company, of Philadelphia, Pa., has purchased the business, stock, fixtures and good will of the Bates Metal Company, of Birmingham, Ala., and will continue the business under the name of The Ajax Metal Company of the South.

The history of the Ajax company has been one of phenomenal growth until it has become one of the largest producers of mixed metals in the United States. Unlike the majority of mixed metal producers, this company has not been content to go along the beaten path, but has made the production of bearing metals a subject of systematic and scientific study. By following along these lines it was able to produce "Plastic Bronze," now recognized as the leading bronze bearing metal on the market. If it had been said twenty-five years ago that the results which have been obtained with this bearing metal were possible one would have scarcely believed it true.

Another indication of the ability of this company is the fact that Mr. G. H. Clamer, the second vice-president of the company, has recently been awarded the Elliott Cresson medal of the Franklin Institute for his process of eliminating impurities from metals.

MAKING BRASS CASTINGS IN METAL MOLDS.

Although the use of sand for making molds for the casting of metals is of very ancient origin, there has been practically no improvement in the process for the last five hundred years. Improvements have been made in the manner of making the molds such as, for instance, the molding machine, but the use of the sand itself and method of making has not been changed.

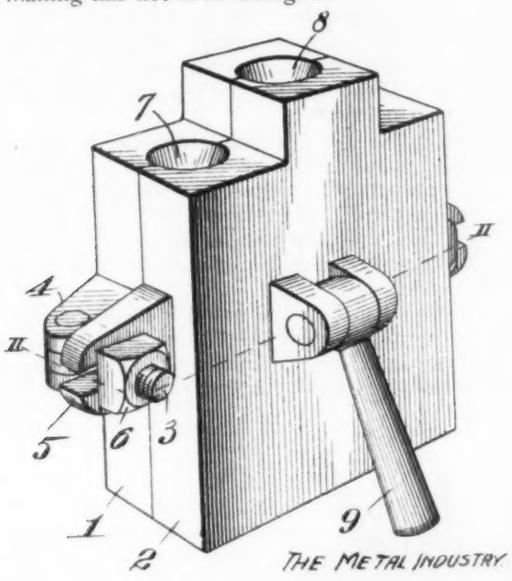


FIG. I

The fact that a new mold must be made for every casting produced in sand, has led many attempts to be made to cast brass in metal molds so that the same mold could be used repeatedly. The results have always been attended with failure. Upon looking at the matter squarely it will be seen that the very reason that sand is used precludes the use of metal for the mold. Sand, being soft, allows the metal to contract without rupture; metal holds it firmly and cracked castings are the result. With iron,

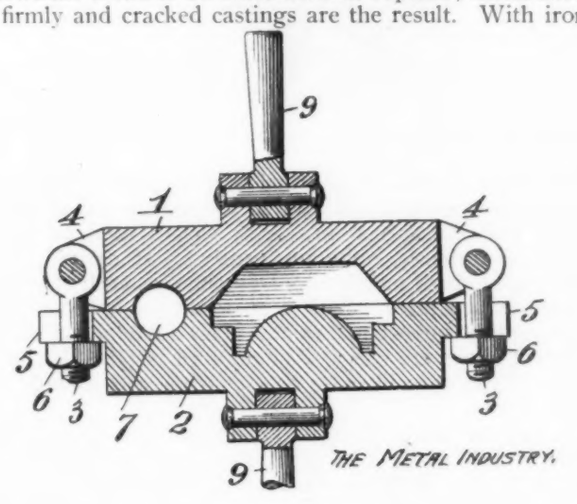


FIG. II.

of course, metal molds are out of the question, because a chilled iron casting is of no value in the arts if any machine work is to be put upon it. If the question of shrinkage is left out and simple shapes are made in which the metal is free to contract, other problems are confronted which have, up to this time, rendered the casting of brass in metal molds quite unsatisfactory. One is the difficulty of running the metal in thin places, and the other the porosity and unsoundness which results from the metal not "lying" closely to the mold. The former is of little importance in many shapes of castings which contain no thin parts, notably car brasses (which are made by the million), but the latter difficulty is one which, up to the present time, does not appear to have been overcome.

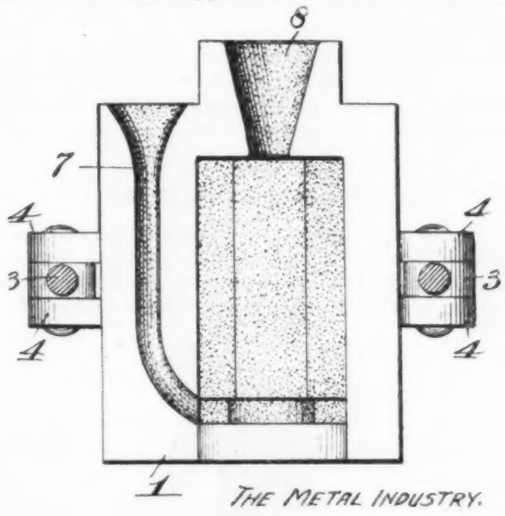


FIG. III

Appreciating the fact that there is a great field in the manufacture of car brasses by means of metal molds, Messrs. Frank J. Friese and John E. Gilbert, of St. Louis, Missouri, have been experimenting along this line and have discovered a method of preventing the porosity or roughness which result when an iron mold is used for making brass castings. They have not only evolved a form of mold by means of which car brasses may be made, but have found that *if the surface of the mold is painted with aluminum paint the metal will "lie to" the surface and be free from the porosity and roughness which results when it is not used.*

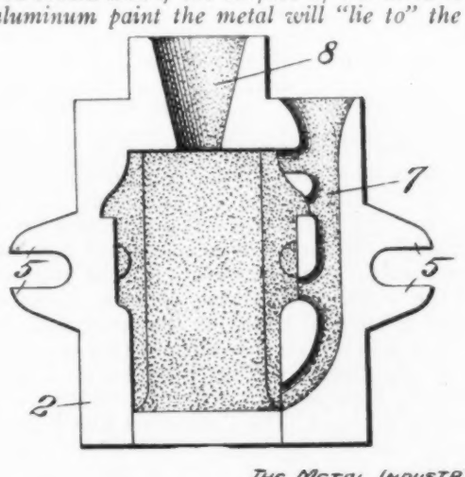


FIG. IV.

In Fig. 1 is shown a mold for casting a car brass ready

for use. The mold is made of cast iron and the halves are clamped together by bolts and the handle "9" serves to the mold. In Figs. 3 and 4 are shown the halves of the mold before clamping. The riser "8" serves to allow the air to escape during the pouring and also acts as a sink head.

To use the mold, the surface is coated with the aluminum paint, or in reality powdered aluminum in any suitable liquid to allow it to be painted on the mold. The inventors say that one application of the aluminum paint lasts some time, but it is advisable to coat it over every day. The mold is then clamped together and warmed and the metal poured into the gate "7" and flows down into the casting.

It is a well established fact that castings made in metal molds are much sounder and more homogeneous than sand castings, so that if a casting can be made in a metal mold it will have this property in its favor.

THE ROCKWELL BRASS FURNACE.

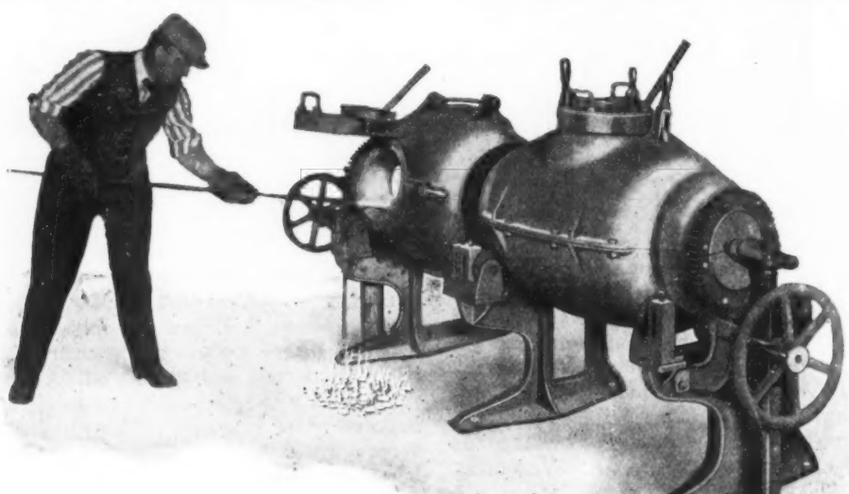
The Rockwell Engineering Company, of 26 Cortlandt street, New York, have recently brought out a new form of brass melting furnace which embodies several new features not inherent in any type of brass melting furnace heretofore made. This company appears to have profited by the furnaces which have previously been invented and have not only equipped the furnace with devices not found in other types, but have actually applied the regenerative principle discovered by Siemens and now used in every open-hearth steel furnace. By the regenerative principle, the waste heat of the furnace is utilized in warming up a batch of metal, so that very little heat is wasted. It is believed on this account that the fuel consumption in this furnace will reach the lowest figure ever produced in the brass industry. Oil is used for the fuel.

The furnace is called "The Compound Revolving Melting Furnace," and in appearance is similar to the well known Charlier, but instead of there being one barrrel shaped chamber it is equipped with two. These are placed end to end, but each furnace is equipped with a burner and handhole together with means for tilting one furnace independently of the other. To begin melting, both chambers are filled with metal and one oil burner is started, but the handhole in the furnace upon which the burner is started is closed. The handhole of the adjoining furnace is left open for the escape of the products of combustion. The flame passes from one chamber to the other, melting the metal in the first and heating up the other to nearly the melting point.

When the metal in the first chamber is melted, the furnace is tilted by means of the hand wheel and the metal poured out. The chamber is next filled with metal and the other burner started. Now the metal in the chamber, which was heated during the first melting is the first to melt while the new charge is warmed up for the next heat. It will be seen that the metal in one chamber is always being heated while the other is being melted or the waste heat is utilized.

The melting in this furnace is practically continuous, as, after the metal in one chamber has been heated by the waste products of combustion very little time is consumed in the melting. If desired, both furnaces may be used at the same time and both burners started. This may be useful in the case of large melts, where heavy castings are to be poured.

No crucibles are used and as oil is employed there are no ashes to wash. An excellent feature of the furnace is the fact that there are no expensive fire-brick shapes to be purchased for relining, but the lining is rammed in the furnace in bulk and burned hard in place. This lining may be purchased in bulk by the barrel, and is, compared with the special fire brick shapes used in other forms of furnaces, quite inexpensive. If desired, two different kinds of metals may be melted, as each chamber is entirely separated. Such a possibility is by no means of secondary importance in the brass foundry, as many different alloys are used. Although oil is generally used for fuel, gas may likewise be employed with equally as good results.



THE ROCKWELL FURNACE—SKIMMING AND STIRRING.

In the cut the method of skimming and stirring the metal is indicated. The metal may be readily mixed in this furnace, as there are no obstacles in the way.

The furnace is made in four sizes ranging from 350 to 3,000 lbs. in each chamber, or giving a total melting capacity of from 750 to 6,000 lbs. The regenerative feature, the inexpensive lining, the ease with which the furnace is manipulated, all render it a very alluring proposition to the brass foundry which is desirous of reducing its costs.

THE PREPARATION OF WORK FOR THE NICKEL BATH.

By F. P. Davis.

Nickel solutions through their being neither very strongly alkaline nor acid in their reaction have practically no cleaning properties, and work to be nickeled must be absolutely chemically clean before it goes into the bath, otherwise the plating will chip or peel or become cloudy or discolored. It is believed, therefore, that the practical cleaning of metals for the nickel bath presents a problem worthy of intelligent consideration. To clean work in large quantities with little or no hand work, that is no handling of individual pieces or scouring, is the proper solution of the problem. The following methods if followed in detail, will be found helpful in accomplishing this result:

All work, no matter what kind of metal, on coming from the buffing department, should go to a benzine bath and be soaked and thoroughly scrubbed in sawdust. This will strike many as an entirely superfluous and unnecessary proceeding, but the expedition given to subsequent operations and the superior results obtained more than compensates for the trouble. The only exception is work of a very plain contour that has received a high finish from dry wheels. This will be sufficiently free from grease to pass directly to the cleaning bath in the plating department.

The first is the soap kettle. Whale oil soap is a valuable friend when properly understood and handled right, but merely a detestable acquaintance under any other circumstances. It has many warm friends and advocates, while there are those who have no use for it at all. The cleansing qualities of the soap depend upon almost entirely the proper preparation of the mixture.

A rectangular wooden vat makes a good container. It should be heated with a single coil of three-quarters inch steam pipe. A degree of heat very little above the boiling point is sufficient to precipitate the contents of the vat on the floor in short order, and the heating surface should be small for this reason. The soap should be cut up in small chips, the smaller the better, and placed in a smaller receptacle with just enough water to cover them. Apply heat for an hour or two until it is thoroughly dissolved. A practical way is by means of an open steam pipe. After it is dissolved, fill the large vat half full of water and bring to the boiling point, then add the soap, boil a few moments and allow it to cool. Next add one pint of aqua ammonia to 50 gallons of the mixture. Soap prepared in this manner will not only soften the buff dirt adhering to the work, but will in half an hour or so dissolve it and remove it.

When the work is removed the soap solution should be near the boiling point and the work should pass directly to hot rinsing water. This point should not be overlooked, as cold water chills the soap and leaves a film that is difficult to remove without scouring. Pass the work next to a hot, strong potash bath, boil up a few moments and pass through cold, clean water. Repeat two or three times. Then clean up in strong cyanide solution, next in perfectly clean running water.

The work now should present a bright, clean appearance, perfectly free from any traces of buff dirt and wet all over. The latter is a good test for chemical cleanliness. If the water breaks on the work or a puff of air blown on the wet surface, it is enough to cause it to break, the work is not chemically clean and the plating will be reasonably sure to flake, especially if the deposit is to be heavy enough for buffing. If this occurs, the water in which the soap was washed off was not hot enough or the potash was not sufficiently hot or strong.

There are many brands of prepared compounds of lye and potash, but the writer has yet to find anything better than first-class rock potash that comes in casks at a low cost.

Work that is soft-soldered should not remain long in the soap, and if much solder is used, not at all, as the galvanic action will spread a film of solder on the work. If this occurs, it can be removed, if not too heavy, by passing the work through clear hydrochloric acid (muriatic acid). This is a good practice when much soldering acid has been used on hollow objects, as it removes the sticky fluid very effectively.

Work well cleaned may be left without injury in clear running water for some time, but it is well, however, to pass it through the cyanide bath just before it goes into the plating solution. Some nickeled work is of a beautiful color, with a mirror-like reflecting surface, while some has a clean, clear color, white in appearance, but shows little reflection. The difference is occasioned entirely by the preparation of the work before plating. Work that is well finished on a "coloring" wheel, and that reaches the plating room in a bright, sparkling condition, that is then cleaned quickly and given a smooth plate without hurrying the deposit and afterward well buffed, will show the former appearance. Work directly from the heavy cutting down wheel, without surface and no shine will show the latter, it will also require heavier coloring rouge than the former. Work that requires bending after plating should receive the deposit slowly, as such a deposit is more tenacious than one driven on by a strong current.

It is not a very difficult matter to re-nickel work that has been cut through in buffing or work that is defective in plate, provided the surface is smooth and not broken by lines where the plate has pushed off. It is best to handle such work separately and make a special job of it. Pass the work through the soap solution, hot water, and potash bath, and scour each piece thoroughly with fresh slacked, white rock lime, of the consistency of cream. This will clean the work, and if properly done will stand the "blowing" test previously spoken of. Rotten stone in a strong solution of cyanide is very good indeed for the same purpose, and should be applied with a soft cotton brush. It is very useful also in the preparation of fine work to be extra heavily plated. The articles to be re-nickeled, after thorough cleaning, should be placed immediately in the plating bath. In plating use only about half the current usually required. But little difficulty should be met with in this operation and the economy over stripping and consequent loss of time is apparent.

The foregoing remarks apply to brass and copper goods only. Iron and steel goods present a different problem. The plater is frequently called upon to plate small iron articles that are not polished. They are usually reeking with mineral oil from the machining and are a bad mess generally. Benzine is a good thing here and the next best thing is a tumbling barrel with plenty of sawdust to absorb the oil, as potash will saponify the mineral oil. The potash should be full double strength of that used for brass or copper. A separate kettle is necessary where much work is to be done. Boil for ten or fifteen minutes, rinse thoroughly and immerse in a pickle composed of equal parts of hydrochloric acid (muriatic acid) and water. Then the cyanide bath the last thing.

When it is desirable to clean work in advance while the bath is in use, such work may be kept from oxidizing in lime water or water with an ounce of sal soda to the

gallon. Work that has been kept in these solutions longer than a half hour should pass through the strong cyanide dip immediately before going to the plating vat. Polished steel, such as bicycle parts, pistols, etc., are usually scoured with wet powdered pumice stone after the potash treatment. But if the potash bath is strong enough to remove all grease and dirt the scouring of each piece may be obviated by the use of hydrochloric acid dip. For this work the acid should be full strength. It is best to have two pots of acid and the work should pass through both; the first to be kept renewed by additions from the second, and the second to be filled as required from fresh, strong acid.

Various theories and practices are current to aid the conductivity of solutions, and add whiteness and a natural color to the deposit. The addition of common salt is endorsed by some, and a few ounces of boracic acid to the gallon of solution is recommended by others. From this to practices too ridiculous to mention. Some of these ideas may give temporary relief to an old solution that has been abused, but in the end they tend to create subsalts and an unbalanced condition. The original ingredients of the nickel solution, viz.: Nickel, sulphuric acid, ammonia, are all an intelligent plater needs to obtain.

If there is any place where an "ounce of prevention" applies, it is in the plating room, and the management that persists in buying salts and anodes from unknown and often unscrupulous dealers at every slight fractional concession in price from standard goods must be satisfied with commonplace or indifferent results. If the plater is found with pure materials, the next essential is to watch the rinsing water. The constant drops of water wear away stone, so the constant drops of impure rinsing water to each article will in time work the plater's undoing. The danger is insidious, lost ground is difficult to recover, and eternal vigilance is the price of safety.

Once a month at the end of a week the nickel bath should receive a clarifying with pure sulphuric acid (oil of vitriol) at the rate of five ounces to 100 gallons of solution. Stir up the solution thoroughly and before using the next week, add enough aqua ammonia to bring back the customary neutrality. Usually it requires about twice as much ammonia as the acid used. Stir the ammonia in lightly, so as not to bring up any sediment from the bottom. The bath is then ready for use. At stated intervals the solution should be decanted or drawn off by means of a siphon and the sediment removed, the vat well washed and the anode frequently scoured clean.

In conclusion, it may be said that if the above directions are followed no better results may be obtained by other methods.

NEW ENGLAND FOUNDRYMEN.

The annual meeting of the New England Foundrymen's Association was held at the Exchange Club, Boston, Wednesday evening, Jan. 13. There was a large attendance, despite bad weather. Following the election of officers Mr. Henry A. Carpenter, the retiring president, made a brief address reviewing the growth of the association in its two years of existence, in which time its membership had increased from ten to 102. Mr. Carpenter was given a rising vote of thanks for his work in promoting the growth of the association. A number of new members were elected at the meeting, and there were several addresses on foundry topics of interest. The New England Association is taking an interest in the Foundry Exhibit Building at the St. Louis Exposition. The following officers were elected for the ensuing year: Bartlett M. Shaw, president; John Magee, vice-president; Fred. E. Stockwell, secretary; George H. Lincoln, treasurer.

SILVERING STEAM GAUGE DIALS.

It is not generally known that much work may be silvered without the use of the battery and that the process is actually carried out in the manufacture of clock and steam-gauge dials. These articles are made of sheet brass and, in order to be conspicuous and at the same time have a pleasing appearance, a thin coating of silver is put upon them.

The use of a bath and electric current is dispensed with in the production of this work, as only a thin coating is desired, and this may readily be put on by the use of the following mixture:

Chloride of silver	1 part
Cream of tartar	1 part
Common salt	1 part

or equal parts of each. It is not necessary that the proportions should be exact. Grind the three ingredients together in a glass, porcelain or stoneware mortar and add just enough water to make a paste. The brass dial to be silvered is made clean by the use of potash solution and rinsing, and the paste rubbed over the surface with a rag or piece of chamois. The silvering immediately takes place.

The coat of silver which is produced in this manner is very white and possesses a pleasing matt or dead surface, which is excellent for the purpose intended, as it does not produce false light reflections.

UNITED STATES METALLIC PRODUCTION, 1903.

In its tabulated estimates of the metallic production of the United States for the year 1903, *The Engineering and Mining Journal* gives the following figures of the nonferrous metals:

Aluminum.—7,500,000 lbs., valued at $2,325,000, as compared with 7,300,000 lbs., valued at $2,284,590 in 1902.

Antimony.—6,967,778 lbs., valued at $535,486, as compared with 7,122,209 lbs., valued at $634,506 in 1902.

Copper.—670,880,000 lbs., valued at $88,334,770, as compared with 610,815,384 lbs., valued at $71,072,586 in 1902.

Gold.—3,600,645 Troy oz., valued at $74,425,340, as compared with 3,870,000 oz., valued at $79,992,800 in 1902.

Lead.—289,030 short tons, valued at $24,492,402, as compared with 280,524 tons, valued at $22,829,043 in 1902.

Nickel.—11,200,000 lbs., valued at $4,872,000, as compared with 10,391,478 lbs., valued at $4,520,293 in 1902.

Quicksilver.—29,103 flasks, valued at $1,295,083, as compared with 34,451 flasks, valued at $1,500,142 in 1902.

Silver.—56,519,793 Troy oz., valued at $30,526,688, as compared with $55,500,000 oz., valued at 29,415,000 in 1902.

Zinc.—156,318 short tons, valued at $16,882,344, as compared with 158,237 tons, valued at $15,317,342 in 1902.

The *Iron and Steel Metallurgist* is the title of a new paper recently issued by Messrs. Sauveur & Whiting, of Boston, Mass. The paper is an outgrowth of the Metallographist, which has been published for some time by the same firm. The new paper has absorbed the latter and the two will be published together. The *Iron and Steel Metallurgist* will be published in the interests of the higher steel metallurgy, and we believe that it will fill a want heretofore unsatisfied. The reputation of the editor and publishers is a recommendation which will suffice for the successful exploitation of the new journal.

CORRESPONDENCE DEPARTMENT

In this Department we will answer any question relating to the non-ferrous metals and alloys. Address THE METAL INDUSTRY, 61 Beekman St., New York

Q.—A valve manufacturer wishes a formula for an alloy which may be used for making valves which will resist the corrosive action of mine water. The ordinary steam metal valve does not seem to resist this action.

A.—The corrosive action of mine water, particularly that of coal mines, is due to the sulphuric acid which it contains and resulting from the oxidation of the iron pyrites in the coal. Iron pyrites contain a large amount of sulphur which becomes converted into the sulphuric acid and thus contaminates the mine water.

As lead resists the action of sulphuric acid better than any of the common metals it is obvious that a bronze containing considerable lead will give good results, and this has been found to be so in actual practice. A good formula for this class of work consists of: Copper, 80 lbs.; tin, 10 lbs.; and lead, 10 lbs. Much care is required in casting this alloy, as it is apt to give poor results if overheated or cast at too high a temperature. Melt the copper under charcoal and add a handful of common salt when it begins to melt, and, after melted, add the tin and lead. Pour at as low temperature as possible.

Q.—Brass moulder says that he is making yellow brass castings for builders' hardware and that the plater who takes the castings after they have been made, complains on account of the spots and streaks which appear after dipping. He says that the plater maintains that the castings are not good, and that no matter hoy they are dipped the spots appear. The mixture is made entirely from new metals, and is as follows, viz.: Copper, 1 lb.; zinc, 8 oz.; lead, ½ oz.; tin, ⅛ oz. The molder thinks the trouble may be from the way that the metal is melted, as he has often seen the crucible two-thirds full of coke which the furnace tender carelessly allowed to fall into the crucible when charging up.

A.—An examination of the castings which were sent do not indicate that there is anything the matter with the metal. The mixture is certainly all right for the work. We have dipped the castings ourselves and find that they come out of the solution as bright and clean as any that we have ever seen, so the difficulty is apparently in the plating room. Have your plater look to his potash bath and see that it is in good condition, and that the castings are *well* rinsed before going into the dip. The work must also be well rinsed after coming from the dip and not allowed to stand after removing as the acid then remains upon the surface and discolors it. Remove the work as quickly as possible, rinse in cold water, then in hot water, and lastly dry in sawdust. The neglect of the latter may result in stains of the character which appear on the castings.

Q.—We have been asked whether there is any dip which is superior to potash for removing the grease from work before plating.

A.—There is nothing which is superior to potash for the removal of grease from work, and there is indeed no substance which can equal it. See article in THE METAL INDUSTRY, January, 1904, page 8, entitled Potash vs. Soda. A tumbling barrel in which the work can be tumbled with sawdust is oftentimes useful as well as a benzine bath, but these are only valuable for the removal of the greater part of the grease when it exists in large amounts. The potash bath should invariably be used as grease is the worst enemy of the plater, and potash is particularly effective in removing it.

Q.—Information is desired about the rolling of zinc, and whether it can be rolled cold.

A.—Zinc must be "broken down" while hot, as it cracks if an attempt is made to roll cold. After the metal has been hot rolled to fairly thin gauges it may be readily rolled cold. The crystalline structure has by this time been destroyed.

Q.—Parties who are using brazing solder wish to know whether silver solder is better than common brazing solder.

A.—Silver solder is better in every way. It is tough, flows better, and makes a stronger joint than the usual spelter solder. The latter is brittle and crystalline and will stand no bending at all. In all places where the maximum strength is desired silver solder should be used.

Q.—An aluminum goods manufacturer wishes to know how a bright polish may be put on aluminum chains.

A.—Aluminum chains may be polished by tumbling them in a tumbling barrel with leather scraps or polishing meal. If this is properly done a good polish will be obtained. If, however, an exceptionally high polish is desired the chains will have to be buffed on a rag buff with rouge or similar compound. This latter operation, however, is usually not necessary, as a sufficiently high polish may be obtained with the tumbling barrel.

Q.—A subscriber wishes to have us inform him of a method which may be used for the determination of the loss which occurs in the making of brass and composition castings. He says that he has determined this himself, but is not certain that his method is correct.

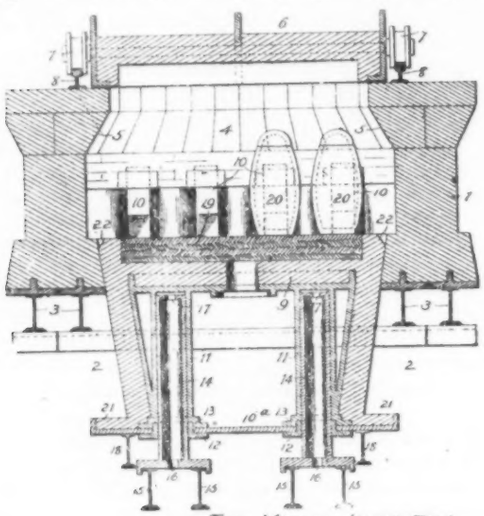
A.—The method is practically one of bookkeeping. For example, let us assume that it is desired to determine the loss for a period of one week. The weight of the metal which is melted for this period of time must be carefully noted. All new metals, sprues, and scrap must be taken into account, and every pound of metal that goes into the crucible. If it is not desired to determine anything but the melting loss then the castings that go to the finishing room should be weighed together with the sprues and metal which remains on Saturday night and the difference between that which has been melted and that which is in the form of castings, sprues, etc., left over will be the loss. Let us take the following case of a small foundry, which makes only composition castings. Record for one week:

Metals melted:	
Copper	5,040 lbs.
Tin	180 lbs.
Lead	180 lbs.
Zinc	600 lbs.
Sprues	2,732 lbs.
Bad castings	202 lbs.
Scrap	1,354 lbs.
Total amount of metal melted	10,288 lbs.
Good castings produced	9,005 lbs.
Sprues, bad castings, etc., not melted	433 lbs.
Metal obtained from ashes	251 lbs.
Total	9,688 lbs.
Total amount of metal melted	10,288 lbs.
Total amount of metal obtained	9,688 lbs.
Loss	600 lbs. = 5.8 per cent.

PATENTS

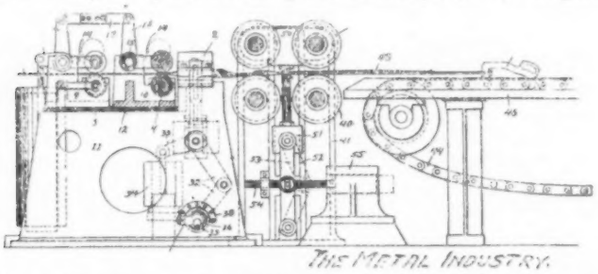
A full copy of any Patent mentioned will be furnished for Ten Cents. Address THE METAL INDUSTRY, 61 Beekman Street, New York

747,019, Dec. 15, 1903. CRUCIBLE FURNACE.—James D Swindell, Pittsburg, Pa., assignor to American Furnace and Machine Co., Pittsburg. In a furnace the combination with a combustion

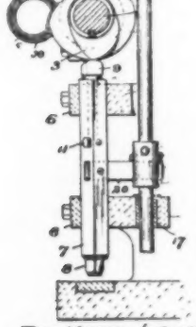


chamber having an opening in its roof, of a movable bottom, and means for raising said bottom into contact with the roof of the combustion chamber to prevent escape of furnace gases.

747,354, Dec. 22, 1903. ELECTRIC WELDING MACHINE.—George Baehr, McKeesport, Pa., assignor to National Tube Company, New York, N. Y., and Pittsburg and McKeesport, Pa., a corporation of New Jersey. In electric tube welding apparatus, the combination with current-conducting devices adapted to bear on the blank, of a welding die, and endless mechanism for drawing the heated blank through said die.



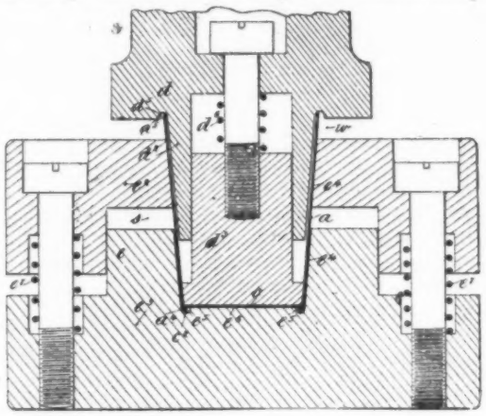
747,900, Dec. 22, 1903. PRESS.—Frederick E. Warner, Waterbury, Conn., assignor to the Waterbury Machine Co., Waterbury, Conn. The combination with the slide; of the lifter-rod; a



bar connecting said slide and lifter-rod; and means for securing said bar to said slide or lifter-rod, comprising a key, and an eccentric-stud mounted so as to bear upon said key.

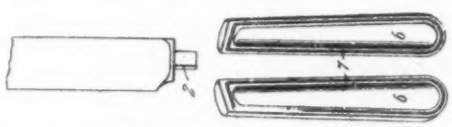
747,483, Dec. 22, 1903. PROCESS OF DISINTEGRATING EMERY WHEELS.—James Rice, Detroit, Mich. The herein-described process for disintegrating emery wheels, which consists in submerging the wheels to be disintegrated in a heated solution of caustic, lye or potash, in about the proportions specified and then washing, drying and grading the residue.

746,843, Dec. 15, 1903. DIE FOR MAKING HOLLOW METAL WARE.—William Jones, Birmingham, England. The combination of a swaging-die provided on its under face with a curling-groove, a block resiliently connected therewith, and a matrix composed of



a fixed and a movable part resiliently connected, the fixed part being provided with a curling-groove.

747,050, Dec. 15, 1903. CUTLERY AND METHOD OF MAKING SAME.—George T. Drabble, Sheffield, England, assignor of one-half to the firm of Needham, Veall and Tyzack, Limited, Sheffield, England. The herein-described method of manufacturing

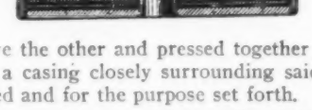


cutlery consisting in first producing the body of the article with a tang at one end thereof, then molding handle-sections, placing the tang against one end of one of said sections and casting a bolster there-around and upon said end, and finally securing the sections of the handles together.

750,239, Jan. 9, 1904. ELECTRICALLY-HEATED SOLDERING-IRON.—William J. Bowen, Cleveland, Ohio, assignor to the Williams-Abbott Electric Company, Cleveland, Ohio, a corporation of Ohio. In a device of the class described, the combination with the heating-coil, of its metallic spool or core carrying the same, said

core being provided with a suitable receptacle or socket, a removable tip portion adapted to be mounted in said receptacle, and an interposed layer of inert material such as described, adapted to protect the mounting portions of said tip and its receptacle or holder, substantially as set forth.

745,501, Dec. 1, 1903. VALVE.—Wilhelm Kuhlmann, Offenbach-on-the-Main, Germany. A flat tightening-plate for valves, consisting of thin metal plates and thin asbestos plates alternately ar-



ranged one above the other and pressed together so as to form a solid plate, and a casing closely surrounding said plate, substantially as described and for the purpose set forth.

745,479, Dec. 1, 1903. ANODE-HOOK.—Frank W. Cann, Brooklyn, N. Y. The combination with an anode-plate provided with a threaded recess, of an anode-hook for electroplating-baths, comprising upper and lower parts threaded at their adjacent ends, the former part having provision for hanging the device and the latter part having a thread for engaging the recess of the anode-plate, and an interiorly-threaded coupling-sleeve for detachably connecting said adjacent ends.

TRADE NEWS

When You Have Any Trade News of Interest Send It to THE METAL INDUSTRY, 61 Beekman Street, New York.

The Montpelier (Ind.) Cup and Metal Works are building an addition 50 by 120 to their present plant. They are also moving into a new two-story brick shop 50 by 150 with an L 50 by 50.

A seven-story factory building, 37 by 88 feet and to cost $60,000, is to be built by the Gorham Manufacturing Company, at Nos. 225 and 227 West Thirty-sixth street, New York City.

The Nashua Iron and Brass Foundry, of Nashua, N. H., has been sold for use as a machine shop and lumber yard. It is not probable that the property will again be used for a foundry.

The Eaton, Cole & Burnham Company, of Bridgeport, Conn., deny that there is to be any merging of interests of their company with the Crane Company, of Chicago. They say that no such merger is contemplated.

It is the intention of the United Lead Company to spend considerable money in improving their existing plants, and at Granite City, Ill., a new large plant will be erected for the manufacture of lead in all forms.

The Celluloid Zapon Company, 12 East Eighteenth street, New York, are making a great variety of lacquers for metal work. Some of their particular grades are known as "Brassoline," "Bronze Medium," "Enameloid," etc.

The firm of Baker & Co., platinum manufacturers, of Newark, N. J., have been incorporated recently with a capital of $430,000. The incorporators are Cyrus O. Baker, Charles W. Baker, Henry R. Bond, Jr., and Edward A. Colby.

E. Reed Burns, of Brooklyn, N. Y., a manufacturer and dealer in electroplaters' supplies, has incorporated the E. Reed Burns Metal Polish and Supply Company, which is to take over a part of Mr. Burns's trade in the Middle West.

Despite a recent slight fire in the spinning department of the George A. Ray Manufacturing Company, of Buffalo, N. Y., the plant of the company is working to full capacity. The company manufacture copper, brass and plated goods.

The Buckley-Hart Manufacturing Company, of Detroit, Mich., have executed a mortgage to the Detroit Trust Company as trustee for the benefit of all of its creditors. The trust company report that the stock and property of The Buckley-Hart Company is to be sold.

The plant of the Sioux City Brass Works, Sioux City, Iowa, was damaged by fire on January 15 to the extent of $3,000, partially covered by insurance. The foundry and plating departments were not destroyed by the fire and the company continues to do business.

Charles J. Bogue, of 213 Center street, New York, has just issued an attractive circular showing a line of dynamos. He manufactures for electroplating, electrotyping and general electrolytic work. Mr. Bogue makes a specialty of this class of electric generators.

A small fire in the foundry of the Frankfort Brass Works, Frankfort, Ind., interfered with the operation of the plant for two weeks. The damage has all been repaired and improvements made in the damaged property. The works are now running the same as usual.

The Royal Plating Company have installed a plating establishment in the Hiscox Building, Whites Court, Norwich, Conn., and have commenced business. A general line of nickel, silver, brass and bronze plating will be carried on for the jobbing trade. All kinds of polishing will be done.

The International Iron and Metal Company, of Newark, N. J., have been incorporated with a capital stock of $30,000 by Stephen McAidle, Thomas J. Reilly and Michael Blake. Besides scrap iron and steel the company will deal in scrap brass and copper and other non-ferrous metals and alloys.

The H. W. Rogers Plating Company, of Buffalo, N. Y., have installed a new 800 ampere dynamo in addition to their old one of 400 amperes. The company are putting in new nickel and copper solutions and report they have as large a plating plant as there is between New York and Chicago.

Owing to the labor troubles in Chicago, the Warner Silver Manufacturing Company have moved their factory to Dixon, Ill. Their new plant will have 25,000 square feet of floor space, and will be equipped with such machinery as will enable the Warner people to produce goods at the least possible cost.

The Toledo Bronze Company have been organized at Toledo, Ohio, with a capital of $50,000. The officers are Charles Fox, president; P. F. Leach, vice-president, and W. F. Booth, secretary. The company will manufacture all kinds of brass, bronze and aluminum castings and succeed the business of Charles Fox & Co.

The metal firm of Holder & Herrick, of Boston, Mass., has been succeeded by the Herrick Company, which have been incorporated with a capital of $100,000 to deal in tin plate, sheet iron and metals. The officers of the company are George W. Herrick, president; Fred L. Greely, vice-president; Herbert W. Blanchard, treasurer.

Through the death of William E. Dodge his interest in the metal firm of Phelps, Dodge & Co., New York, terminated on December 31, 1903. The business will be conducted by the surviving partners under the same firm name. The partners of the firm are D. Willis James, Cleveland; H. Dodge, James McLean and Arthur Curtiss James.

The Spieler & Winter Manufacturing Company, of Syracuse, N. Y., have recently been incorporated and will make bronze dies by a special process. The dies are said to be cast in metal molds and to possess sufficient hardness to adapt them for a large number of uses. George Winter is president and August J. Spieler is secretary and treasurer.

The business of the William Wilcox Manufacturing Company, of Middletown, Conn., together with the good will, tools, stock, etc., has been sold to S. R. Slaymaker, of Lancaster, Pa., who manufactures the same line of goods. The William Wilcox Manufacturing Company is an old company and this purchase removes it entirely from Connecticut.

The New Jersey Aluminum Company, of Newark, N. J., have moved into the new addition to their factory, which connects with their old building. At present they are using the lower floor of the shop as a shipping room. The company are also equipping their entire plant with electric lights. The company manufacture sheet aluminum goods and castings in aluminum, brass and bronze.

The M. S. Benedict Manufacturing Company, of East Syracuse, N. Y., have closed recently a contract for silverware amounting to $90,625. The goods are for a New York publishing house, which gives premiums with subscriptions and is said to be the largest order of this class ever placed with an individual firm. The spoon department of the company will be enlarged and new machinery installed.

The W. H. Sweeney Manufacturing Company, of Brooklyn, N. Y., have bought property in the rear of their present plant, at 66 Water street, measuring 52 by 100 feet, upon which they

will build a seven-story factory building. The company have already moved into their new upper story, which was recently built on their present factory. They report that business opens splendidly for the new year.

The old factory building at Bristol, Conn., occupied by the Wallace Barnes Company, spring manufacturers for japanning, was destroyed by fire January 3, with a loss of $5,000. The building was nearly a century old and for the most of the time was occupied by hardware and clock manufacturers. The Barnes Company are already rebuilding, and will be operating their japanning department by February 10.

The Seymour Manufacturing Company, of Seymour, Conn., manufacturers of rolled German silver, brass and bronze, have about completed their new muffle building and the installation of the muffle. The building is of brick with steel truss roof, and the muffle was designed by the Rockwell Engineering Company, so that either oil or wood may be used for fuel. At present it is intended, however, to use oil for annealing.

The new works of James Bonar & Co., Inc., Pittsburg, Pa., are about completed. The plant is located at Fortieth street and A. V. R. R., and will be thoroughly equipped with modern machinery for the casting and finishing of brass goods. The firm, which has recently been incorporated with a capital of $75,000, has the following officers: James Bonar, president; Reed F. Blair, vice-president; Joseph Cawley, secretary; George G. Semans, treasurer.

A fire in the upper floor of the factory building of the E. W. Bliss Company, Brooklyn, N. Y., wiped out entirely the main office and draughting room of the company. The damage to the lower factory floors was from water only. The company will rebuild the destroyed portion of their plant and have established temporary offices in a new building across the street from their present works. The company manufacture presses, dies and special machinery.

Official announcement is made of the organization of the United States Hardware Manufacturing Company, which will have an extensive plant at Port Clinton, Ohio, for the manufacture of harness hardware of all kinds and also light hardware. George E. Eberhard, who has been prominently identified with other hardware manufacturing interests, is president and general manager, and P. J. Martin vice-president and superintendent of the new corporation.

Mr. J. A. Williams, who for fifteen years has been manager of the Union Foundry Works, Catasauqua, Pa., has leased the brass department of the Crane Iron Foundry in the same city and will make high grade brass, bronze and copper castings, taking up in the near future a line of electric railway castings. Mr. Williams's plant will be known as the Hercules Metal Works, and he reports that notwithstanding the general business depression, he is meeting with fair encouragement.

Godfrey L. Cabot, of Boston, Mass., the well known manufacturer of carbon black, has begun the manufacture of a new bronze called "Alphab-Bronze" at Saxonburg Station, Butler County, Pa. This bronze is said to have a tensile strength of 60,000 lbs. per sq. in., with 25 per cent elongation for the hard grade, and a tensile strength of 35,000 lbs. per sq. in., with 72 per cent elongation for the softer grade. The bronze will be sold in the form of sand castings and in ingots if desired.

The Griswold Manufacturing Company, of Erie, Pa., expects to be located in their new foundry early in February. Their new plant is a large one, measuring 180 by 270 feet, and besides the foundry there are three other large buildings, the dimensions of one of which are 75 by 200 feet. The company have also built a separate power plant, in which they have installed a large electric generator and will operate their plant by electric power. They manufacture iron and aluminum castings in hollow ware, gas ranges and stove furnirtu.e

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The Lunkenheimer Company, of Cincinnati, Ohio, makers of brass specialties, report that owing to the continued demand for their goods they have increased their facilities to such an extent that they are now in a position to guarantee reasonably prompt shipments. The company will shortly place some new specialties upon the market and which specialties will be described in a new complete catalogue to be isued in the course of a few months. The export trade of the company is growing through their foreign branches.

The estate of the late William E. Dodge, formerly president of the Ansonia Brass and Copper Company, of the Ansonia Clock Company and a member of the firm of Phelps, Dodge & Co., of New York, has recently been appraised and the value given as $7,114,298. Among the various stocks which were appraised were the following: 4,170 shares of the American Brass Company, of Waterbury, Conn., valued at $417,000; 20,000 shares of the Ansonia Clock Company, valued at $500,000; and 10,000 shares in the Detroit Copper Company, valued at $300,000.

The Vulcan Manufacturing Company has purchased the factory of the Kellogg & Wakefield Company, at Winsted, Conn., and are about to commence the manufacture of chemically pure copper castings and other copper products. An addition will be built to the fonudry and two more stories will be added to the main building. This company is organized with a capital of $600,000, and the officers are: president, William Spittler; vice-president, William R. Dodge; secretary, Charles B. Greene; general manager, George F. Dinsmore. The New York salesroom is at No. 11 Broadway.

The S. Obermayer Company, of Cincinnati, Ohio, announce that they are general sales agents for the new Lunkenheimer brass melting furnace, which furnace was described in the December number of THE METAL INDUSTRY and a further description of which may be seen on another page. During the past year the S. Obermayer Company, of Cincinnati, shipped 4,410 full carloads, aggregating 160,852,000 pounds, of their products of foundry supplies, which, at an average of 30,000 pounds per car, equals 5,353 cars, and allowing 30 cars of 34 feet in length to a train, equals 178 train loads, or forty miles of foundry supplies.

The Bridgeport Chain Company has commenced the manufacture of the Mitchell tongueless buckle, patent rights of which they have acquired. This buckle is an innovation in the buckle line and may be used for an ornamental body buckle as well as for general uses. This company is now fitting up a plating department and will put out this buckle in all kinds of finishes as well as in sterling silver. Common buckles will also be manufactured. Buckle manufacturing will be conducted in a separate department and will form a valuable and natural adjunct to their large chain industry.

"Signs of the Times" is the title of a very attractive booklet issued by the New York store of the Waterbury Brass Company, No. 122 Center street. The booklet relates to signs, describing the different sheet metals used for this purpose and also showing some of the best examples of sign and memorial work. Altogether it contains valuable information for the sign maker. Besides the sign book the Waterbury Brass Company issues a number of other pamphlets on brass and copper sheet, rod, wire and tubing, giving prices and interesting information for the consumers of these metals. The New York store carries one of the largest and well assorted stocks to be found anywhere of brass, bronze and German silver.

The Pittsburg Reduction Company, of Pittsburg, Pa., make a number of grades of aluminum and casting alloys which are suitable for different purposes. Their No. 1 aluminum is guaranteed to be over 99 per cent pure and is made in the form of ingots for remelting. No. 2 is guaranteed to be over 90 per cent and is used only in alloying iron and steel. A number of casting alloys are produced, which are branded as follows: A, machines, drills and taps readily and flows well in casting; B, old trade name, Nickel Aluminum, best flowing of all casting alloys; G, for castings to be drop forged; H, has the smallest shrinkage of all the alloys; M, old trade name, Special Casting Alloy, for stiff castings and castings in which the metal must fill out difficult parts; N, old trade name, Sibley Alloy, strongest of all the alloys.

Metal Prices, Februray 2, 1904

METALS

	Price per lb.
TIN—Duty Free.	
Straits of Malaca	28.00
COPPER, PIG, BAR AND INGOT AND OLD COPPER—Duty Free. Manufactured 2½c. per lb.	
Lake	12.50
Electrolytic	12.35
Casting	12.25
SPELTER—Duty 1c. per lb.	
Western	5.00
LEAD—Duty Pigs, Bars and Old 2⅛c. per lb.; pipe and sheets 2½c. per lb.	
Pig Lead	4.50
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb.	
Small lots	37.00
100 lb. lots	35.00
1,000 lb. lots	34.00
Ton lots	33.00
ANTIMONY—Duty ¾c. per lb.	
Cooksons	8.25
Halletts	7.00
Other	6.25
NICKEL—Duty 6c. per lb.	
Large lots	40 to 50
Small lots	50 to 75
BISMUTH—Duty Free	$1.50 to $2.00
PHOSPHORUS—Duty 18c. per lb.	
Large lots	45
Small lots	65 to 75
	Price per oz.
SILVER—Duty Free—Commercial Bars	$0.58
PLATINUM—Duty Free	19.00
GOLD—Duty Free	20.00
QUICKSILVER—Duty 7c. per lb. Price per Flask	47.50

Sheet Lead, 7¾c. per lb., 20 per cent. off.
Lead Pipe, 6¾c. per lb., 20 per cent. off.
Zinc—Duty, Sheet, 2c. per lb.; 600-lb. casks, 7.50c. per lb., open, 8c. per lb.
Tobin Bronze—Rods, Unfinished, 19c.
Tobin Bronze—Rods, Finished, 20c.

PRICE FOR ALUMINUM BRONZE INGOTS.

	Per pound.
2½ per cent	19c.
5 per cent	19½c.
7½ per cent	20½c.
10 per cent	21½c.

Manganese Bronze, Ingots	16½c.
Phosphor Bronze, Ingots	15 to 18c.
Silicon-Copper, Ingots	34 to 36c.

OLD METALS

	Buying.	Selling.
Heavy Cut Copper	10.50c.	12.00c.
Copper Wire	10.00c.	11.50c.
Light Copper	9.50c.	10.00c.
Heavy Mach. Comp	9.50c.	10.50c.
Heavy Brass	7.00c.	8.00c.
Light Brass	5.50c.	6.25c.
No. 1 Yellow Brass Turnings	6.50c.	7.25c.
No. 1 Comp. Turnings	8.00c.	9.00c.
Heavy Lead	4.10c.	4.30c.
Zinc scrap	3.75c.	4.00c.
Scrap Aluminum, sheet, pure	22.00c.	25.00c.
Scrap Aluminum, cast, alloyed	16.00c.	20.00c.
Old Nickel	15.00c.	25.00c.

PRICES OF SHEET COPPER

SIZES OF SHEETS.		96oz. & over 75 lb. sheet 30x60 and heavier	64oz. to 96oz. 50 to 75 lb. sheet 30x60	32oz. to 64oz. 25 to 50 lb. sheet 30x60	24oz. to 32oz. 18¾ to 25 lb. sheet 30x60	16oz. to 24oz. 12½ to 18¾ lb. sheet 30x60	14oz. and 15oz. 11 to 12½ lb sheet 30x60
		CENTS PER POUND.					
Not wider than 30 ins.	Not longer than 72 ins.	18	19	19	19	19	20
	Longer than 72 ins. Not longer than 96 ins.	18	19	19	19	19	20
	Longer than 96 ins.	18	19	19	19	19	21
Wider than 30 ins. but not wider than 36 ins.	Not longer than 72 ins.	18	19	19	19	19	21
	Longer than 72 ins. Not longer than 96 ins.	18	19	19	19	19	21
	Longer than 96 ins. Not longer than 120 ins.	18	19	19	19	20	22
	Longer than 120 ins	18	19	19	20	21	
Wider than 36 ins. but not wider than 48 ins.	Not longer than 72 ins.	18	19	19	20	21	23
	Longer than 72 ins. Not longer than 96 ins.	18	19	19	20	22	24
	Longer than 96 ins. Not longer than 120 ins.	18	19	19	21	23	27
	Longer than 120 ins.	18	19	20	22	25	
Wider than 48 ins. but not wider than 60 ins.	Not longer than 72 ins.	18	19	19	20	22	25
	Longer than 72 ins. Not longer than 96 ins.	18	19	19	21	23	28
	Longer than 96 ins Not longer than 120 ins.	18	19	20	22	25	
	Longer than 120 ins	19	20	21	23	27	
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 ins.	18	19	20	22	27	
	Longer than 96 ins Not longer than 120 ins.	18	19	21	24	29	
	Longer than 120 ins.	19	20	22	27		
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 ins.	19	20	22	25		
	Longer than 96 ins. Not longer than 120 ins.	20	21	23	26		
	Longer than 120 ins.	21	22	24	28		
Wider than 108 ins.	Not longer than 132 ins.	22	23	25			
	Longer than 132 ins.	23	24	27			

Rolled Round Copper, ⅝ inch diameter or over, 21 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, wider than 17 inches take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 2½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

Metal Prices, February 2, 1904

COPPER BOTTOMS, PITS AND FLATS

Net Cash Prices.

14 oz. to square foot, and heavier, per lb. .... 23c.
Lighter than 10 oz. .... 24c.
10 oz. and up to 12 oz. .... 26c.
12 oz. and up to 14 oz. to square foot, per lb. .... 29c.
Circles less than 8 in diam., 2c. per lb. additional.
Circles over 13 in. diam., are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1c. per lb. extra.

PRICE LIST FOR ROLL AND SHEET BRASS

Prices are for 100 lbs. or more of sheet metal in one order. Brown & Sharpe's Gauge the Standard.

Common High Brass	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Wider than and including	2 12	12 14	14 16	16 18	18 20	20 22	22 24	24 26	26 28	28 30
To No. 20 inclusive..	.22	.23	.25	.27	.29	.31	.33	.36	.39	.42
Nos. 21, 22, 23 and 24	.22	.24	.26	.28	.30	.32	.34	.37	.40	.43
Nos. 25 and 26........	.23	.24½	.27	.29	.31	.33	.35	.38	.41	.44
Nos. 27 and 28........	.23	.25	.28	.30	.32	.34	.36	.39	.42	.45

Add ½ cent per lb. additional for each number thinner than Nos. 28 to 38, inclusive.

Add 7 cents per lb. for sheets cut to particular lengths, not sawed, of proportionate width.

Add for polishing on one side, 40 cents per square foot; on both sides, double this price.

Brazing, Spinning and Spring Brass, 1 cent more than Common High Brass.

Extra Quality Brazing, Spinning and Spring Brass, 2 cents more than Common High Brass.

Low Brass, 4 cents per lb. more than Common High Brass.

Gilding, Rich Gold Medal and Bronze, 7 cents per lb. more than Common High Brass.

Discount from List, 30 per cent.

PRICE LIST FOR BRASS AND COPPER WIRE

BROWN & SHARPE'S GAUGE THE STANDARD.	Com. High Brass	Low Brass	Gilding Bronze and Copper
All Nos. to No. 10, Inc	$0.23	$0.27	$0.31
Above No. 10 to No. 16..	.23⅛	.27⅛	.31⅛
Nos. 17 and 18..................	.24	.28	.32
" 19 and 20..................	.25	.29	.33
No. 21..................	.26	.30	.34
" 22..................	.27	.31	.35
" 23..................	.28	.32	.33
" 24..................	.30	.34	.38

Discount, Brass Wire, 30 per cent.; Copper Wire, 40 per cent.

PRICES FOR SEAMLESS BRASS TUBING

From 2 in. to 3¾ in. O. D. Nos. 4 to 12 Stubs Gauge, 19c. per lb. Seamless Copper Tubing, 22c. per lb.

For other sizes see Manufacturer's List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe size.....	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.......	33	29	20	19	18	18	18	18	18	18	18	20	20	22	24	25

BRAZED BRASS TUBING

Brown & Sharpe's Gauge the Standard.

													Per lb
Plain	Round	Tube,	¾	in.	up	to	2	in.,	to	No.	19,	inc.	$0 35
"	"	"	⅝	"	"		¾	"		"	19,	"	36
"	"	"	½	"	"		⅝	"		"	19,	"	38
"	"	"	⅜	"	"		½	"		"	19,	"	41
"	"	"	5/16	"	"		⅜	"		"	19,	"	48
"	"	"	¼	"	"		5/16	"		"	19,	"	65
"	"	"	3/16	"	"		¼	"		"	19,	"	1 00
"	"	"	⅛	"	"		3/16	"		"	19,	"	1 50

Smaller than ⅛ inch.................. Special
2 inch to 3 inch, to No. 19, inclusive 38
3 inch.................. 40
Over 3 inch to 3½ inch.................. 45
Over 3½ inch.................. 50

Bronze and copper advance 3 cents. Discount 30 per cent.

PRICE LIST FOR SHEET ALUMINUM

PLATE AND SHEET PRICE LIST.—B. & S. GAUGE.

Prices are for 50 pounds or more at a time. Less quantities, 5 cents per pound additional. Charges made for boxing.

Wider Than.. ... And Including...	*3 in. 12 in. in coils.	6 in. 14 in.	14 in. 16 in.	16 in. 18 in.	18 in. 20 in.	20 in. 24 in.	24 in. 30 in.	30 in. 36 in.	36 in. 40 in.	40 in. 45 in.	45 in. 50 in.	50 in. 55 in.	55 in. 60 in.	Polishing One Side.	Sat. Fin. without Lacquer. One Side.
No. 13 & heavier..	......	42	44	44	44	44	47	47	47	48	48	49	50	2	6
" 14..........	......	42	44	44	44	44	47	47	47	48	48	49	50	2	6
" 15..........	......	42	44	44	44	44	47	47	47	48	48	49	50	2	7
" 16..........	......	42	44	44	44	44	47	47	47	48	48	49	50	2	8
" 17..........	......	42	44	44	44	44	47	47	47	48	48	49	50	3	9
" 18..........	......	42	44	44	44	44	47	47	50	51	51	54	57	3	10
" 19..........	......	42	44	44	44	44	47	48	51	52	52	56	59	4	11
" 20..........	42	44	44	44	44	46	49	50	52	53	53	58	61	4	12
" 21..........	42	46	46	46	46	48	51	52	58	59	62	65	......	5	14
" 22..........	42	46	46	46	48	48	51	55	59	61	64	......	......	5	16
" 23..........	42	46	46	46	48	48	51	57	60	64	......	......	......	6	18
" 24..........	42	46	48	50	50	50	53	59	62	......	......	......	......	6	20
" 25..........	44	47	49	51	51	51	54	61	......	......	......	......	......	7	23
" 26..........	44	47	50	54	54	54	59	......	......	......	......	......	......	8	25
" 27..........	44	48	52	56	56	57	62	......	......	......	......	......	......	10	28
" 28..........	44	48	54	56	57	57	64	......	......	......	......	......	......	11	32
" 29..........	46	49	56	58	60	60	69	......	......	......	......	......	......	13	36
" 30..........	46	50	58	60	64	70	77	......	......	......	......	......	......	15	40
" 31..........	48	52	60	63	68	76	......	......	......	......	......	......	......	17	44
" 32..........	50	54	62	66	74	82	......	......	......	......	......	......	......	19	50
" 33..........	52	56	......	......	......	......	......	......	......	......	......	......	......	21	57
" 34..........	55	60	......	......	......	......	......	......	......	......	......	......	......	25	66
" 35 & 36.......	1 67	Not wider than 6 in.	......	......	......	......	......	......	......	......	......	......	......	Polished two sides double above prices.	Satin Finish two sides double above prices.
" 37 & 38.......	1 98		......	......	......	......	......	......	......	......	......	......	......		
" 39 & 40.......	2 22		......	......	......	......	......	......	......	......	......	......	......		
".003" to .0015"..	2 42		......	......	......	......	......	......	......	......	......	......	......		
Less than .0015"..	2 66		......	......	......	......	......	......	......	......	......	......	......		

Additional charge for slitting coiled sheet in widths less than 3 in. and flat rolled sheets in widths less than 6 in. All columns except the first are for Flat Rolled Sheets.

Discounts as follows are given for sheet orders over 200 pounds.

200 to 1,000 pounds.................. 10 per cent. off list.
1,000 to 2,000 " 10 per cent. and 2 " "
2,000 to 4,000 " 10 " " 3 " "
4,000 pounds and over 10 " " 5 " "

Sheets polished or satin-finished on both sides, double the price for one side.

Price Per Foot of Seamless Aluminum Tubing.

(CHARGES MADE FOR BOXING.)

THICKNESS OF WALL IN STUBS' GAUGE.

Outside Diameter in Inches.	No. 12.	No. 14.	No. 16.	No. 18.	No. 20.	No. 22.	No. 24.		Outside Diameter in Inches.
1-4......	......	......	......	10	9	8	7		1-4
5-16....	......	......	......	11	9	8	7		5-16
3-8......	......	......	......	12	9	8	7		3-8
1-2......	......	......	17	14	11	9	8		......1 2
5-8......	......	......	21	16	13	12	......		5-8
3-4......	......	......	25	19	16	14	......		3-4
7-8......	......	......	28	22	18	16	......		7-8
1..........	......	......	30	25	21	19	......		......1 00
1 1-4......	......	......	36	30	25	......	......		......1 1 4
1 1-2......	......	52	43	35	28	......	......		......1 1-2
1 3-4......	......	60	50	41	33	......	......		......1 3 4
2..........	84	68	58	47	37	......	......		......2 00

Discount 20 to 30 per cent.

ALUMINUM

Drawn Rod and Wire Price List.—B. & S. Gauge.

Diameter B.& S.G'ge.	0000 to No.10	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price per lb	$ 38	38½	38½	0 39	39½	0 40	40½	0 41	0 42	0 43	0 44	0 47	0 52

200 lbs. to 30,000 lbs., three cents off list.

30,000 lbs. and over, four cents off list.